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"To complete a series, any specimen is better than none."

"A copy, model or picture of a good thing is often more useful than an actual specimen of a poor one."

"Restorations made in such a manner that the part restored is not at once distinguishable are unpardonable."

"A label (in the exhibition series) should answer all the questions which are likely to arise in the minds of the persons examining the object to which it is attached."

Dr. Goode's critical notes on various museums, introduced as illustrations of the principles discussed, are so interesting as to suggest that the author would render the scientific public a further service, if he could find time to expand this little pamphlet into a moderate-sized treatise on the museums of the world and their administration.

WM. NORTH RICE.

*Spectrum Analysis.* DR. JOHN LANDAUER.

Brunswick, Fred. Vieweg & Sohn. 1896.

This handbook of some 175 pages is substantially a reprint of the author's article upon Spectrum Analysis, which appeared in the 'Handbook of Chemistry' of Drs. Fehling and Hell. Though now somewhat enlarged, it still treats more particularly of the chemical applications of the subject. A brief historical introduction, covering the time from Melville to the present day, is followed by tolerably complete descriptions of instruments for obtaining and examining the various spectra. No attempt is made to develop the theory of any of the instruments considered. The conditions affecting the character of emission and absorption spectra, and the empirical formulæ which have been suggested to express the relation between the lines and groups in the spectra of different elements are also touched upon, and then follow tables of wave-lengths of various metallic spectra. These embody the recent work of Kayser & Runge, Rowland and others, and all wave-lengths are expressed in Rowland's scale. Rowland's (1892) table of solar wave-lengths is also given, and the principal astronomical applications of spectroscopy are briefly treated in some fifteen pages at their end. Throughout

the book copious references are given to original papers, etc., the whole forming a fairly complete resumé. The English student will find the German unusually clear and concise.

C. E. M.

#### SCIENTIFIC JOURNALS.

JOURNAL OF GEOLOGY, APRIL-MAY.

*The Magmatic Alteration of Hornblende and Biotite:* By HENRY S. WASHINGTON.

It is well known to petrographers that these minerals, under some conditions, tend to alter into a granular mass of augite and magnetite. The causes of this alteration are here discussed. After reviewing current theories, including that of Zirkel, the author proceeds to develop his own views. He finds that this alteration is most common in the intermediate group of volcanic rocks. He also finds it rare in the plutonic rocks. From the latter fact he infers that conditions of slight pressure are favorable to the changes. The theory proposed is that hornblende and biotite crystals are formed at an early (intratelluric) stage of eruption under conditions of great pressure, and probably in presence of mineralizers. As they approach the surface in the course of an eruption the pressure diminishes, leaving the temperature still high until a point is reached where the substance is no longer stable. Here a molecular change is begun which induces a molar change, so that the chemically and physically homogeneous hornblende or biotite becomes the heterogeneous granular aggregate of augite and magnetite. The origin of the augite andesites is then discussed in the light of this theory.

*On the Origin of the Chouteau Fauna:* BY HENRY SHALER WILLIAMS.

In a former number of the *Journal of Geology* the origin of this fauna was discussed by Stuart Weller. In the present paper the author dissents from two opinions therein expressed (1) that the Chouteau fauna was contemporaneous with the Chemung fauna of New York, and (2) that it arose by the mingling of a fauna which in the Devonian was represented by the Hamilton in New York and the general Devonian fauna of Europe represented by the Middle Devonian of Iowa and British America. Three